

WHAT IS CLAIMED IS:

1. A method for detecting the presence of an individual behind a wall, comprising the steps of:

projecting a CW radar signal through a wall;

detecting portions of the CW radar signal returned by an object behind the wall;

determining the phase difference between projected and returned CW radar signals; and,

indicating the presence of an individual when the change in the detected phase difference is above a predetermined threshold, whereby individuals moving behind the wall can be detected.

2. The method of Claim 1, wherein the frequency of the projected signal is constant.

3. The method of Claim 2, wherein the frequency is in the 900 MHz band.

4. The method of Claim 1, wherein the threshold is an adaptive threshold.

5. The method of Claim 1, and further including the step of determining the location of a moving individual behind the wall from peaks in the graph of phase difference versus distance.

6. Apparatus for the detection of a moving individual behind a wall, comprising:
 - a frequency source;
 - a power divider coupled to said frequency source for outputting as a first output a CW signal of one predetermined magnitude for forming a radar beam and for outputting as a second output a CW signal of a diminished magnitude;
 - a circulator coupled to said first output;
 - an antenna coupled to said circulator for transmitting a CW radar beam towards said wall and for detecting radar returns from objects behind said wall;
 - a mixer coupled to said second output and said circulator for deriving a signal representing the phase difference between transmitted and returned signals at said antenna; and,
 - a detector for detecting when there is a change in the phase difference between said transmitted beam and said returns, said phase difference indicating the presence of a moving object behind said wall.
7. The apparatus of Claim 6, wherein said detector includes a processor for sampling the output of said mixer, a threshold detector for ascertaining when said change in phase difference of the output of said mixer exceeds an adaptive threshold, and a motion indicator responsive to the output of said threshold detector for the presence of a moving object behind said wall.
8. The apparatus of Claim 7, wherein the frequency of said transmitted signal is constant, thus to provide a single-frequency CW radar.

9. The apparatus of Claim 8, wherein said single frequency is in the 900 MHz band.
10. The apparatus of Claim 6, wherein said threshold detector is an adaptive threshold detector.
11. The apparatus of Claim 6, wherein said detector detects a moving object behind said wall based on a change in the phase difference between the of the transmitted and returned signals.
12. The apparatus of Claim 11, wherein said phase difference is sensed as a change in the graph of phase difference versus time.
13. The apparatus of Claim 6, wherein said antenna is a directional antenna having minimal back lobes to prevent any motion behind said antenna from affecting said phase difference.
14. The apparatus of Claim 13, wherein said antenna is a YAGI antenna.
15. The apparatus of Claim 13, wherein said antenna is a planar antenna having conductive elements spaced from a ground plane.
16. A system of determining the presence of an individual behind a wall, comprising:

a CW radar having a directional antenna adapted to project CW radar energy through said wall, and detecting returns from objects behind said wall; and,

a phase difference detector for detecting the phase difference between CW energy directed through said wall and energy returned from objects behind said wall, a change in phase difference indicating the presence of a moving object behind said wall.

17. The system of Claim 16, wherein said CW radar operates in the 900 MHz band.

18. The system of Claim 16, wherein said CW radar is a single-frequency radar, whereby no clutter rejection is necessary and no long integration times are required.

19. The system of Claim 16, wherein said directional antenna has minimal back lobes to reject motion behind said antenna so that behind-the-antenna motion is not detected.